

CLAIMS

1. Transgenic non-human animal, preferably a knock-in mouse, having a missense mutation in the $\alpha 4$ - or $\beta 2$ -subunit of the neuronal nicotinic acetylcholine receptor (nAChR).
5
2. Animal of claim 1, having the missense mutation V287L or V287M in the gene for the $\beta 2$ -subunit.
- 10 3. Animal of claim 1, having the missense mutation 259-260ins, S252L, 766ins3 or T265I in $\alpha 4$ -subunit of the nAChR receptor.
4. Animal of any one of claims 1 to 3 containing the missense mutation homozygously.
- 15 5. Animal of any one of claims 1 to 3 containing the missense mutation heterozygously.
6. Targeting vector containing the following components operatively linked:
 - the genomic and/or cDNA sequence for a subunit of the, preferably human or murine, nicotinic acetylcholine receptor (nAChR) having a missense mutation in the $\alpha 4$ - or $\beta 2$ -subunit, or a part of said subunit, wherein said part has at least the missense mutation in the $\alpha 4$ - or $\beta 2$ -subunit.
20
 - a selectable marker gene, and
 - optionally 2 recognition sequences for a recombinase, which flank the marker gene.
- 25 7. Targeting vector of claim 6, wherein the selectable marker is an antibiotic resistance gene.
8. Targeting vector of claim 6 or 7, wherein the recognition sequences are each loxP.

9. Targeting vector of one or more of claims 6 to 8, wherein the β 2-subunit has the mis-sense mutation V287L or V287M.

5 10. Targeting vector of one or more of claims 6 to 8, wherein the α 4-subunit has the mis-sense mutation 259-260ins, S252L, 766ins3 or T265I.

11. Stem cell, preferably murine embryonic stem cell, containing a vector of one or more of claims 6 to 10.

10

12. Screening method for the identification of compounds for the treatment of the human epilepsy syndrome, particularly familiar nocturnal frontal lobe epilepsy (ADNFLE), comprising the following steps:

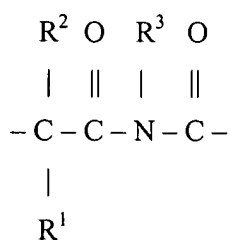
- a) providing an animal of any one of claims 1 to 5 and providing test compounds,
- 15 b) administration of the test compounds to the animal,
- c) selection of a test compound resulting in alleviation or elimination of the symptoms of the epilepsy syndrome in the animal, and
- d) optionally repeating the steps a) to c) with a suitably modified form of the test compound chosen in c).

20

13. Screening method of claim 12, wherein the test compounds are selected from the following groups:

- barbiturates, oxazolidindiones and succinimides and further groups having the following grouping as a common structural element:

25



30

wherein R¹ and R² are alkyl or aryl residues and R³ is H or an alkyl residue,

or

- derivatives of benzodiazepines, sultiam, Carbamazepin and valproic acid.

5

14. Compound for the treatment of the human epilepsy syndrome, preferably of ADNFLE, which has been identified by the method of claim 12 or 13.

10

15. Pharmaceutical composition having a therapeutically effective dose of one or more compounds of one or more of claims 12 to 14 and a pharmaceutically acceptable carrier.

16. Use of the composition of claim 15 for the treatment of the human epilepsy syndrome, preferably ADNFLE.

15